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EXAMINER	
BEHM, HARRY RAYMOND	
ART UNIT	PAPER NUMBER
2838	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/530,720	KIMATA ET AL.	
	Examiner	Art Unit	
	Harry Behm	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *23-28* is/are allowed.

6)☒ Claim(s) *20-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to the new claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 20 - 22 rejected under 35 U.S.C. 102(e) as being anticipated by Ho (US 6,819,078).

With respect to Claim 20, Ho discloses an apparatus for controlling a power converter in which an output voltage is controlled by pulse-width-modulation control, the apparatus comprising:

a voltage-vector control unit (Fig. 2 Active Vector Calculation, Zero Vector Selector, Precalculation) that determines, based on a voltage instruction value (Fig. 2 Ua,Ub) for the power converter, voltage vectors (Fig. 2 Ta_Rvec_R, Tb_Vec_R) including zero-voltage vectors (T0_Vec_1, T0_Vec_2), output from the power converter

in a control cycle of the pulse-width-modulation control and durations (Fig. 2 Ta_Cnt_R, Tb_Cnt_R) of outputting of the voltage vectors;

a voltage-vector adjusting unit (Fig. 2 Rescale and Overmodulation) that adjusts the durations of outputting of the voltage vectors so that,

if total of the durations of outputting of the zero-voltage vectors in the control cycles is longer than a predetermined time (Fig. 5 T0_Cnt_Scl > 0), the voltage-vector adjusting unit adjusts durations of outputting of the zero voltage vectors to a fixed time or longer [longer than 0], and,

if the total is shorter than the predetermined time (Fig. 5 T0_Cnt_Sel < 0), the voltage vector adjusting unit adjusts the durations of outputting of the zero voltage vectors to zero (Fig. 5 T0_Cnt_Sel = 0); and

a firing-pulse generating unit (Fig. 2 PWM Counters) that generates a signal for turning on and off semiconductor switching elements included in the power converter, based on the durations of outputting of the voltage vectors, as adjusted by the voltage-vector adjusting unit.

With respect to Claim 21, Ho discloses the apparatus according to claim 20, wherein the voltage-vector adjusting unit (Fig. 5) adjusts the durations of outputting of the zero voltage vectors to the fixed time or longer (Fig. 5 T0_Cnt_Sel) without changing relative ratio between durations of outputting of non-zero voltage vectors (Fig. 5 Ta_Cnt_Sel, Tb_Cnt_Sel), excluding the zero-voltage vectors

With respect to Claim 22, Ho discloses the apparatus according to claim 20, wherein, the voltage-vector adjusting unit (Fig. 5 Rescale and Overmodulation) adjusts

durations of outputting of non-zero voltage vectors (Fig. 5 Ta_Cnt_Sel, Tb_Cnt_Sel), excluding the zero-voltage vectors, to another fixed time or longer (Fig. 5 Ta_Cnt_Sel * PWM_CNT_MAX / Tab_Cnt_Tot and PWM_CNT_MAX – Ta_Cnt_Sel), or to zero, if the voltage- vector adjusting unit adjusts the durations of outputting of the zero voltage vectors to zero.

Claims 20 - 22 rejected under 35 U.S.C. 102(b) as being anticipated by Xu (US 5,552,977).

With respect to Claim 20, Xu discloses an apparatus for controlling a power converter in which an output voltage is controlled by pulse-width-modulation control, the apparatus comprising:

a voltage-vector control unit (Fig. 8 120) that determines, based on a voltage instruction value (Fig. 1 Vs*) for the power converter, voltage vectors (Fig. 2 V1-V6), including zero-voltage vectors (Fig. 2 V0,V7), output from the power converter in a control cycle of the pulse-width-modulation control and durations of outputting of the voltage vectors;

a voltage-vector adjusting unit (Fig. 8 122-136) that adjusts the durations of outputting of the voltage vectors so that,

if total of the durations of outputting of the zero-voltage vectors in the control cycles is longer than a predetermined time (Fig. 8 t0 > 0), the voltage-vector adjusting unit adjusts durations of outputting of the zero voltage vectors to a fixed time or longer (Fig. 8 t0' = t0), and,

if the total is shorter than the predetermined time (Fig. 8 t0 < 0), the voltage vector adjusting unit adjusts the durations of outputting of the zero voltage vectors to zero (Fig. 8 126); and

a firing-pulse generating unit (Fig. 1 106) that generates a signal for turning on and off semiconductor switching elements (Fig. 1 SA+, SC-) included in the power converter, based on the durations of outputting of the voltage vectors, as adjusted by the voltage-vector adjusting unit.

With respect to Claim 21, Xu discloses an apparatus according to claim 20, wherein the voltage-vector adjusting unit adjusts the durations of outputting of the zero voltage vectors to the fixed time or longer (Fig. 8 124) without changing relative ratio between durations of outputting of non-zero voltage vectors (Fig. 8 t1',t2'), excluding the zero-voltage vectors

With respect to Claim 22, Xu discloses the apparatus according to claim 20, wherein, the voltage-vector adjusting unit adjusts durations of outputting of non-zero voltage vectors (Fig. 8 t1,t2), excluding the zero-voltage vectors, to another fixed time or longer (Fig. 8 130-136), or to zero, if the voltage- vector adjusting unit adjusts the durations of outputting of the zero voltage vectors to zero (Fig. 8 126).

Allowable Subject Matter

Claims 23-28 allowed.

The following is a statement of reasons for the indication of allowable subject matter:

With respect to Claim 23, the prior art does not disclose or suggest, in combination with the limitations of the base claim and any intervening claims, primarily, wherein a voltage-vector adjusting unit that adjusts the durations of outputting of the voltage vectors so that, if total of the durations of outputting of the zero-voltage vectors in the control cycles is shorter than a predetermined time, the voltage-vector adjusting unit adjusts durations of outputting of middle zero voltage vectors, between two adjacent control cycles, to zero, and distributes the durations of outputting of the middle zero-voltage vectors to duration of outputting of end zero-voltage vectors at ends of the two adjacent control cycles.

With respect to Claim 24, the prior art does not disclose or suggest, in combination with the limitations of the base claim and any intervening claims, primarily, wherein a voltage-vector adjusting unit that adjusts the durations of outputting of the voltage vectors so that, if total of the durations of outputting of the zero-voltage vectors in the control cycles is shorter than a predetermined time, the voltage-vector adjusting unit groups durations of outputting identical voltage vectors in the control cycles into one.

With respect to Claim 25, the prior art does not disclose or suggest, in combination with the limitations of the base claim and any intervening claims, primarily, wherein a voltage-vector adjusting unit that adjusts the durations of outputting of the voltage vectors so that, if total of durations of outputting the zero-voltage vectors is shorter than a predetermined value, upon receiving voltage vectors used for an adjustment in a previous control cycle, the voltage-vector adjusting unit, based on

whether a voltage vector lastly output in the previous control cycle is a zero-voltage vector, adjusts a first duration of outputting one of the zero-voltage vectors in a current control cycle to zero and distributes an amount of the first duration to a second duration of outputting another of the zero-voltage vectors.

With respect to Claim 26, the prior art does not disclose or suggest, in combination with the limitations of the base claim and any intervening claims, primarily, wherein a voltage-vector adjusting unit that adjusts the durations of outputting of the voltage vectors so that, upon receiving voltage vectors used for an adjustment in a previous control cycle, if a total of a third duration of outputting of a zero-voltage vector lastly adjusted in the previous control cycle and a fourth duration of outputting of a zero-voltage vector firstly received from the voltage-vector control unit in a current control cycle is shorter than a predetermined time, the voltage vector adjusting unit adjusts the fourth duration to a fifth duration which is obtained by subtracting the fourth duration from the predetermined time.

With respect to Claim 27, the prior art does not disclose or suggest, in combination with the limitations of the base claim and any intervening claims, primarily, wherein adjusts the durations of outputting of the voltage vectors by calculating an error generated by an adjustment of the durations of outputting of the voltage vectors and by correcting the durations of outputting of the voltage vectors in a current control cycle with the error calculated in a previous control cycle.

With respect to Claim 28, the prior art does not disclose or suggest, in combination with the limitations of the base claim and any intervening claims, primarily,

wherein a voltage-vector adjusting unit that adjusts the durations of outputting of the voltage vectors by changing durations of outputting of the zero-voltage vectors to zero and replacing a first voltage vector firstly output in a current cycle with a last voltage vector lastly output in a previous control cycle, if the last voltage vector is different from the first voltage vector.

The aforementioned limitations in combination with all remaining limitations of the respective claims are believed to render the aforementioned indicated claim and any dependent claims thereof patentable over the art of record.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry Behm whose telephone number is 571-272-8929. The examiner can normally be reached on 7:00 am - 3:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm E. Ullah can be reached on (571) 272-2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jeffrey Sterrett
Primary Examiner